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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,006	01/15/2002	Scott M. Hartley	101-27	6356

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EXAMINER	
ZACHARIA, RAMSEY E	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/047,006	HARTLEY ET AL.	
	Examiner	Art Unit	
	Ramsey Zacharia	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,9,12-15,17-21,23-28,30,34-36 and 38-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,9,12-15,17-21,23-28,30,34-36 and 38-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

2. Claims 27, 28, 30, 34-36, and 38-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The term "proximate" in independent claim 27 is a relative term which renders claims 27, 28, 30, 34-36, and 38-40 indefinite. The term "proximate" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Use of the term "proximate" renders proximity of the Hansen solubility parameters indefinite.

Claim Rejections - 35 USC § 103

4. Claims 1, 2, 4, 9, 12-15, 17-21, 23-28, 34-36, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (WO 00/20157) in view of Ullmann's Encyclopedia of Industrial Chemistry (5th Edition, Volume A18: Paints and Coatings).

Jones et al. teach a welded workpiece formed by exposing the joint region at the weld to radiation so as to melt the surface of one or both pieces at the joint, then allowing the melted material to cool and weld the workpiece together (page 1, lines 27-33). A radiation absorbing

material is provided in the joint region (page 1, lines 34-36). The radiation absorbing material is an NIR dye having a high molar absorption coefficient, good solubility in the host polymer, and does not degrade to colored by-products (page 3, lines 10-20). The dyes also have high extinction coefficients (page 3, lines 29-32). The dye can be incorporated into the joint region as a coating solution applied to the surface by painting (page 4, line 22-page 5, line 34). A suitable concentration of the dye is 0.001-0.1 $\mu g/mm^2$, i.e. 1-100 ng/mm^2 (page 10, lines 16-34). The dye dissolved in a suitable solvent may be painted over the joint region with resultant deposition of the dye both at the surface and infusion of the dye very slightly into the substrate of thin polyethylene or polyetheretherketone films or other polymeric substrates (page 11, lines 3-13). The surface of the workpiece of Jones et al. reads on a "reflective surface" as recited in the claims because it is made of a polymer which softens on heating and the claims do not require any degree of reflectivity.

Because the radiation absorbing material in the joint region of Jones et al. appears to be the same as that used in the instant invention (i.e. 1-100 ng/mm^2 of an NIR dye having high absorption and extinction coefficients that degrades to a non-colored by-product) it is taken to inherently be capable of converting inbound radiant energy at a welding wavelength over about 0.1 J/mm^2. Moreover, because the dye is miscible in the polymer (as evidenced by the teaching that the dye may be incorporated into a polymer film or the polymer workpiece itself), the degradation by-products should also be miscible in the polymer.

Regarding claim 9, the depth to which the dye penetrates when applied as a coating onto the surface of one of the workpieces must inherently be sufficiently small to avoid foaming during welding since Jones et al. do not teach that the welding causes foaming. Moreover, if

foaming were present, the appearance of the joint would be affected. That the welding process Jones et al. does not affect the appearance of welded joint indicates that there is no foaming.

Regarding claim 12, the transmission through the joint region of Jones et al. at the welding wavelength is lower than the optical transmission though the bulk portions because the joint region is designed to absorb energy at the welding wavelength and the bulk portions are designed to be optically transparent. The radiation absorbing material in the joint region of Jones et al. is taken to inherently be capable of converting the radiation into thermal energy via successive electronic-to-thermal and chemical-to-thermal conversion activities because it is designed to heat up the joint region and the material appears to be the same as used in the instant invention (i.e. 1-100 ng/mm^2 of an NIR dye having high absorption and extinction coefficients that degrades to a non-colored by-product).

Regarding the optical properties recited in claims 13-21, since the material used by Jones et al. appears to be the same as that used in the instant invention (i.e. 1-100 ng/mm^2 of an NIR dye having high absorption and extinction coefficients that degrades to a non-colored by-product), it should inherently have the same optical properties.

Jones et al. do not teach the concentration of the dye in the coating solution.

However, Jones et al. do teach that the dye may be applied to the joint region as a coating composition to a final coating weight of 1-100 ng/mm^2. The concentration of the coating solution affects the coating weight of the final product. That is, the concentration is a results effective variable.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the concentration of dye in the coating solution, since it has

been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2nd 272, 205 USPQ 215 (CCPA 1980).

Jones et al. do not explicitly recite that the paint has a necessary viscosity, surface tension, and drying time to provide a substantially laminar welding zone with a defined edge. However, Jones et al. do teach that applying the dye by painting offers flexibility in that only selected areas can be treated (page 5, lines 25-27). That is, Jones et al. teach that applying the dye by painting allows for coating a defined area the outer border of which demarcates a defined edge.

Ullmann's Encyclopedia of Industrial Chemistry illustrates that paints comprises as a basic component a film forming substance such as cellulose nitrite or vinyl chloride polymers, i.e. thermoplastic materials (page 364, column 2). Various additives may conventionally be incorporated into paints, such as driers and leveling agents (page 365, column 2-page 366, column 1). Finally, paints comprise a solvent composition selected to adjust the viscosity and improve wetting (i.e. surface tension) and leveling. That is, Ullmann's Encyclopedia of Industrial Chemistry demonstrates that viscosity, surface tension, and drying time are well understood processing parameters for paints to be used as coatings and that it requires no more than ordinary skill in the art to adjust the paint composition to provide for a smooth final coating.

Therefore, it would have been obvious to one skilled in the art to select as a paint composition, a composition with appropriate viscosity, surface tension, and drying time to provide a smooth coating over the joint region. One of ordinary skill would desire to provide a smooth coating in order to maintain a uniform concentration of NIR dye across the joint region

and thus yield a uniform weld. A smooth coating results in the formation of a substantially laminar welding zone.

Regarding the newly added limitations in claim 1, Jones et al. do not teach the addition of photoptically occluding or heat-sinking additives.

Regarding the newly added limitations in claim 12 that the transmission-enhancing region exhibits about a 10% greater photopic transmission, this quality appears to result from the use of a material system that is mutually miscible with the reflective surfaces (i.e. the workpiece) (see page 6, lines 15-23 of the instant specification). Because the dye of Jones et al. is also miscible in the polymer of the workpiece, it should also intrinsically exhibit the same change in photopic transmission.

Regarding the newly added limitations in claim 27, it appears from the instant specification that mutually miscible systems have numerically proximate Hansen solubility parameters and result in the absence of occlusions in the transmission-enhancing region (see page 6, lines 15-23). Since Jones et al. teach the use of a dye that is miscible in the polymer (as evidenced by the teaching that the dye may be incorporated into a polymer film or the polymer workpiece itself), the material of the joint region and the polymer of the workpiece should have numerically proximate Hansen solubility parameters. This is further supported by the observation that that the welding process does not affect the visible appearance of the joint region - an observation that indicates an absence of occlusions.

Response to Arguments

5. Applicant's arguments filed 23 December 2005 have been fully considered but they are not persuasive.

The applicants note that painting is an application process that is different from paint, which is defined by Ullmann's as a product containing pigments(s) which forms an opaque film when applied to a substrate. However, it is noted that this "definition" is applicable only to ISO 4618/1 and does not appear relevant to the instant case. The primary reference, Jones et al., explicitly teaches that their welding dye may be applied by painting, and anything that is applied by painting must be a paint. The very first sentence of Ullmann's appears to support this interpretation: "[p]aints, coating materials, and with some restrictions lacquers are synonymous terms." If paints and coating materials are synonymous terms, clearly paints encompass more than just opaque coatings sine not all coating materials are opaque.

The applicants argue that it is not obvious to take the dye from Jones et al. film or workpiece, combine it with the acetone solvent mentioned, add paint modifiers and achieve the results set forth in the amended claims. The applicants further note that acetone is volatile and causes crystallization of polycarbonate.

This is not persuasive. Jones et al. explicitly teach the application of their dye to a workpiece by a painting process. As such, one skilled in the art would be motivated to look to the paint art for guidance and Ullmann's demonstrates that viscosity, surface tension, and drying time are well understood processing parameters for paints to be used as coatings. Moreover, it is noted that neither the instant claims nor the prior art require the use of acetone and/or polycarbonate.

The applicants argue that modification of solutions to provide an opaque coating containing pigments would not preserve the reflective surface of the workpiece and would occlude or detrimentally introduce heat-sinking additives into the welding zone.

This is not persuasive because Jones et al. explicitly teach that their joint region absorb radiation outside the visible range such that the visible appearance of the joint region and workpiece is not affected (page 1, line 27-page 2, line 5). This is offered as an improvement over other welding approaches that are limited by the need to provide at least one workpiece that is opaque to visible light (page 1, lines 25-26). Therefore, one skilled in the art would clearly be motivated to not add any opaque agents to the joint region of Jones et al., particularly in view of the above discussion showing that Ullmann's does not limit paints to opaque materials.

The applicants argue that, while Jones generally describes unaffecting the appearance of the joint, claim 12 characterizes the degree of reflectivity by reciting a 10% greater photopic transmission in the optically fused region. Moreover, it is argued that neither reference suggests having the dye, the vehicle, and the by-products comprise numerically proximate Hansen solubility parameters to obtain enhanced photopic values through the welding zone.

This is not persuasive because Jones et al. appears to be using the same dye (an NIR dye having high absorption and extinction coefficients that degrades to a non-colored by-product) in the same concentrations (1-100 ng/mm^2) for the same purposed (laser welding) to obtain the same product (welded workpiece with a visibly unaffected joint region) as the instant invention. As such, the article of Jones et al. appears to be the same as that of the instant invention. It appears from the instant specification that the use of a material system that is mutually miscible with the reflective surfaces results in 10% greater photopic transmission and the mutually

miscible systems are those having numerically proximate Hansen solubility parameters of the dye, the vehicle, the by-products, and the reflective surfaces (see page 6, lines 15-23). Jones et al. teach that their dye (and by extension by-products formed from the degradation of the dye) are to be miscible in the polymer to be welded (i.e. the reflective surface material), i.e. have numerically proximate Hansen solubility parameters. As such, it would be expected that the material of the joint region article of Jones et al. would exhibit a 10% greater photopic transmission in the optically fused region. That the Jones et al. is silent with respect to changes in photopic transmission does not render the claims patentably distinct because the article of Jones et al. appears to intrinsically possess this characteristic and the discovery of a previously unappreciated property of a prior art invention does not render the old invention patentably new to the discoverer. See MPEP 2112.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

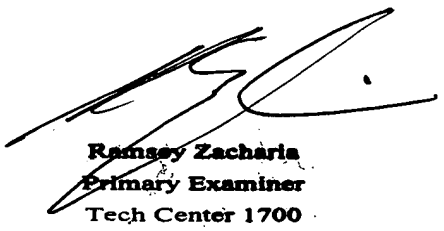
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramsey Zacharia whose telephone number is (571) 272-1518. The examiner can normally be reached on Monday through Friday from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney, can be reached at (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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